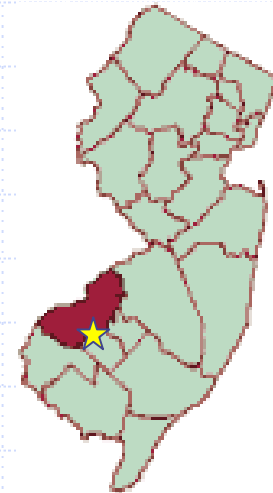


Watershed Assessment Through Undergraduate Research

Joseph J. Orlins
DeMond Miller
Jennifer Misner
Jess Everett
John Hasse
Kauser Jahan



Rowan University
Glassboro, NJ

Overview

◆ Opportunities for Research

- Engineering Clinic Curriculum
- Interdisciplinary outside Engineering

◆ Examples of Student Research Projects

- Engineering
- Sociology
- Geography

Engineering Clinics at Rowan

Year	Fall	Spring
Freshman	Measurements	Reverse Engineering
Sophomore	Design & Written Communication	Design & Oral Communication
Junior	Open-ended projects & research	
Senior	Open-ended projects & research	

Upper-level Clinics

- ◆ 4 Semester sequence (8 credits total)
- ◆ Open-ended projects
 - Basic Research
 - Applied Research
 - Design
- ◆ Small groups: 3-5 students
 - Interdisciplinary
 - ◆ Civil, Chemical, Mechanical, Electrical Engineering
 - Written and oral presentations

Other Research Opportunities

◆ Coursework

- Biological monitoring of stream communities
- Plant diversity

◆ Funded research grants

- Algal populations in lakes
- Using GIS to quantify urban sprawl

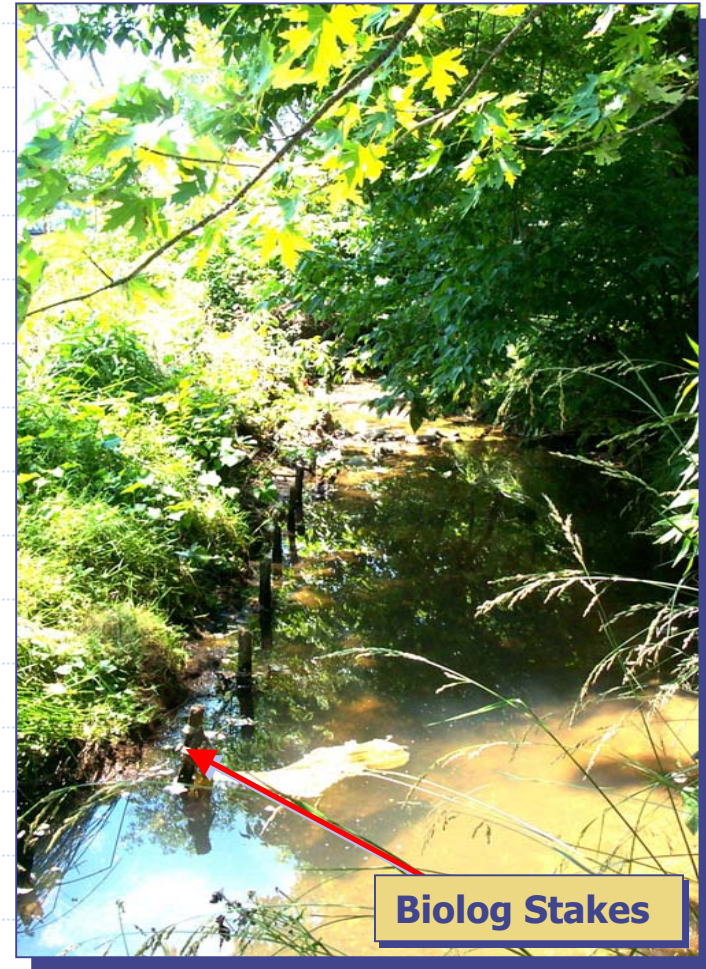
◆ NSF Research Experiences for Undergraduates (REU) programs

Case Studies

- ◆ Streambank Stabilization
- ◆ Dam Safety
- ◆ Education and Outreach
- ◆ Watershed Assessment

Streambank Stabilization

- ◆ Chestnut Branch of Mantua Creek
 - Bisects Rowan Campus
 - Existing problems due to poor past practices
- ◆ NJDEP 319(h) Project
 - Gloucester County
- ◆ Students Involved with:
 - Assessment
 - Modeling
 - Design
 - Installation



Dam Safety Analyses

◆ Private Dams

- Subject to Dam Safety Regulations
- Repair/Upgrade OR Remove

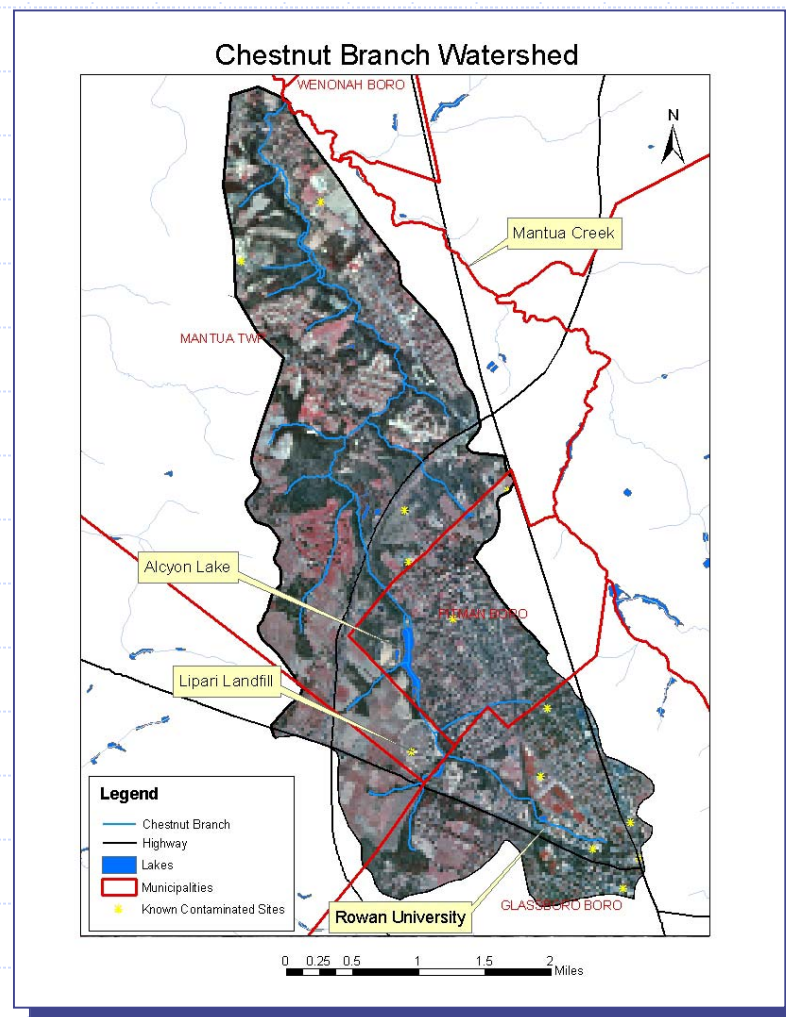
◆ Academic – Private – Public Partnership

- Students conduct:
 - ◆ Site assessments
 - ◆ Modeling & analysis
 - ◆ Reporting
 - ◆ Stakeholder Presentations

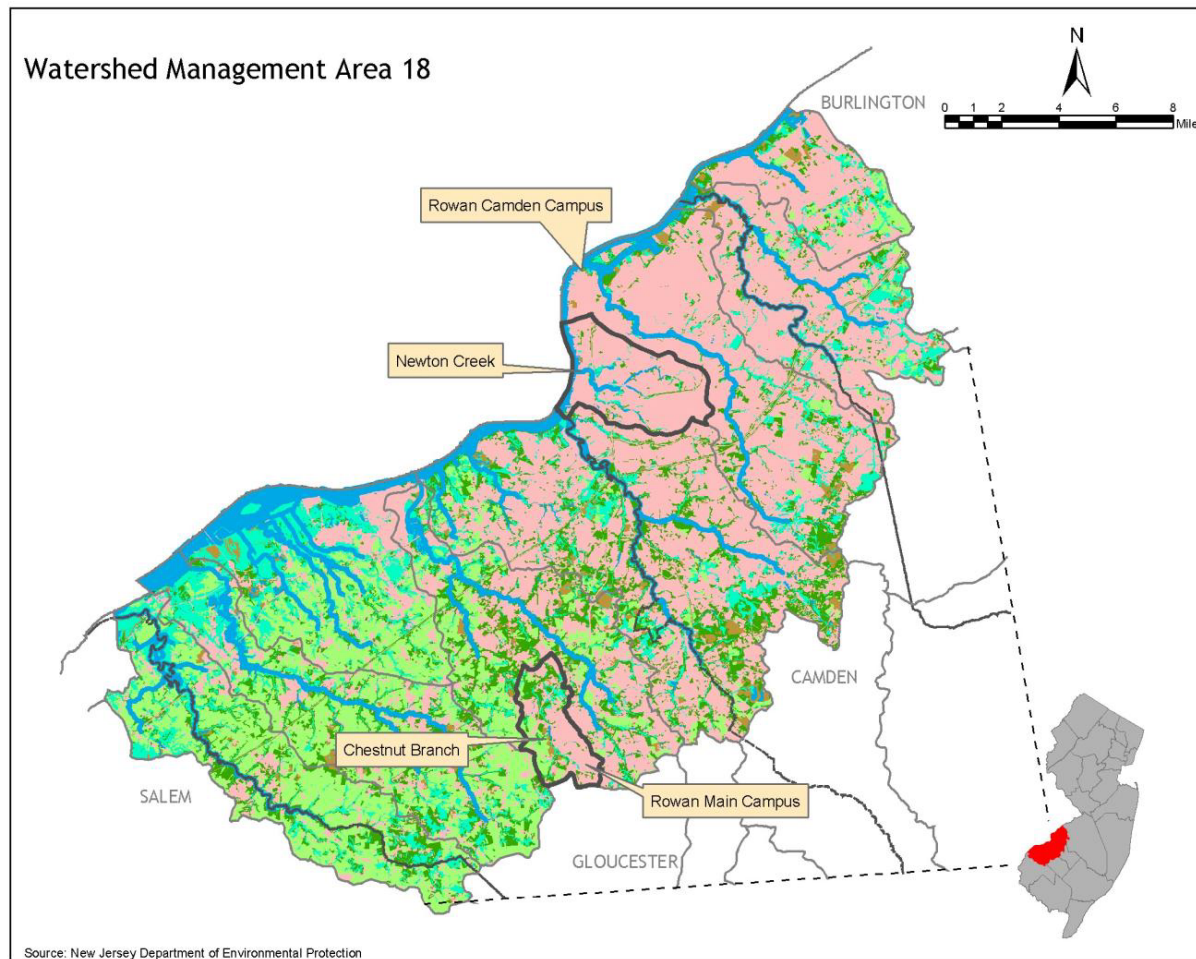


Assessment & Outreach

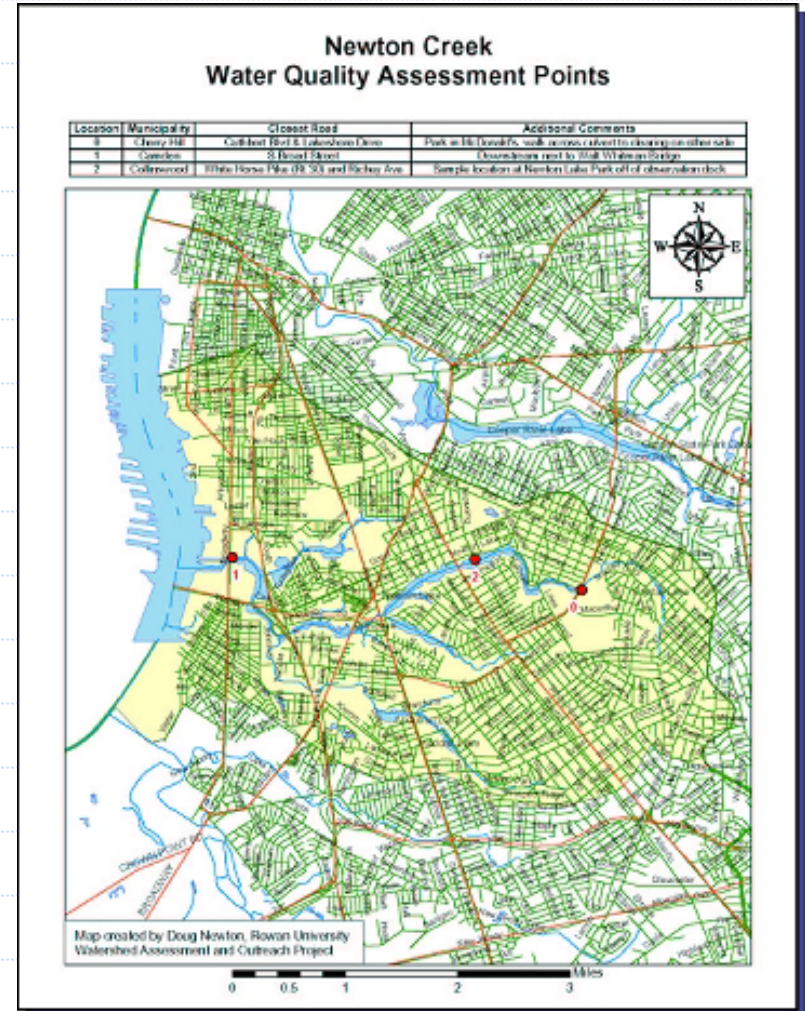
- ◆ EPA Project
- ◆ Packaging of Environmental Data
 - Existing Data
 - Stream Assessments
 - Stormwater Facilities
- ◆ Students Involved with:
 - Field investigations
 - Water Quality Sampling
 - GIS development
 - Multimedia presentations



Targeted Watersheds



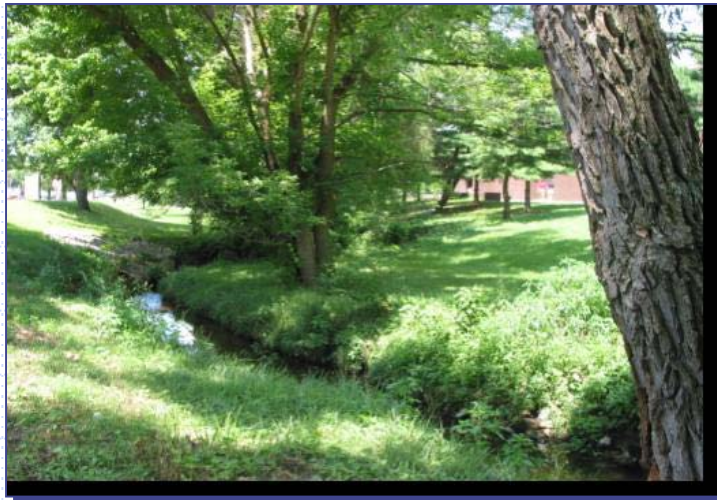
Newton Creek: Camden



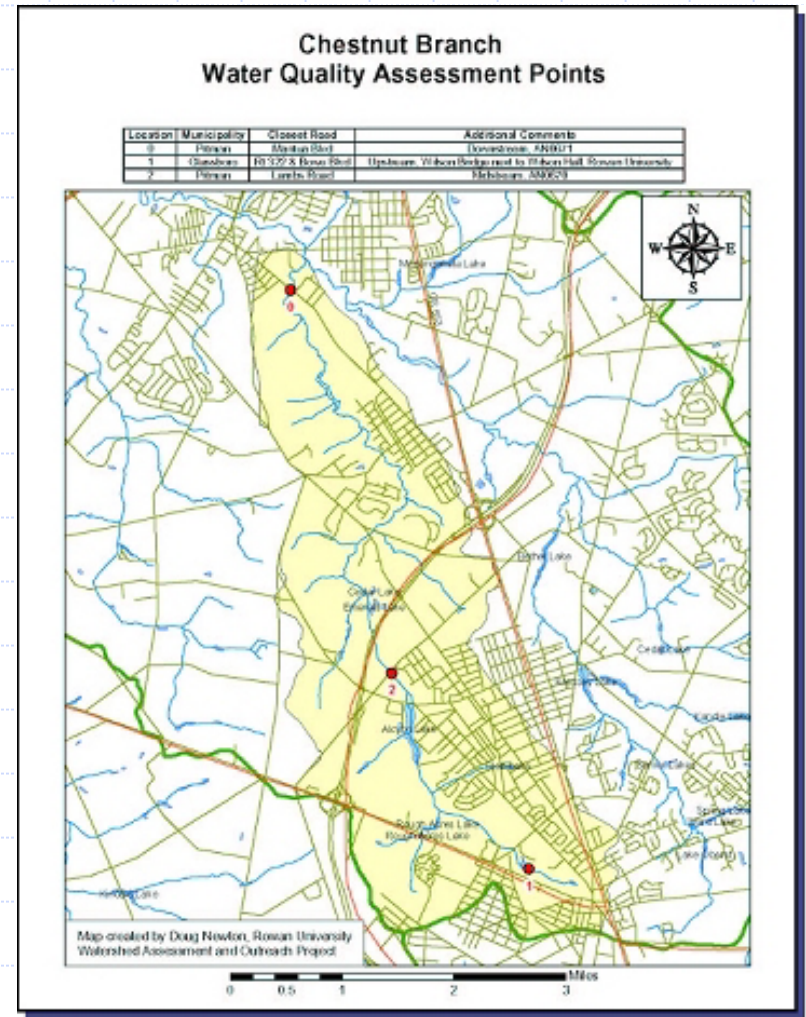
November 7-8, 2003

NJ Volunteer Monitoring Summit

Chestnut Branch



November 7-8, 2003



NJ Volunteer Monitoring Summit

Stream Assessments

- ◆ Visual: *stream reaches, outfalls, detention basins*
- ◆ Physical: *flow, depth*
- ◆ Chemical: *DO, Temp, conductivity, pH, TSS, turbidity, phosphorus, nitrogen*
- ◆ Biological: *Coliform*
- ◆ Students involved with:
 - Field investigations
 - Water quality sampling
 - GIS development
 - Multimedia presentations

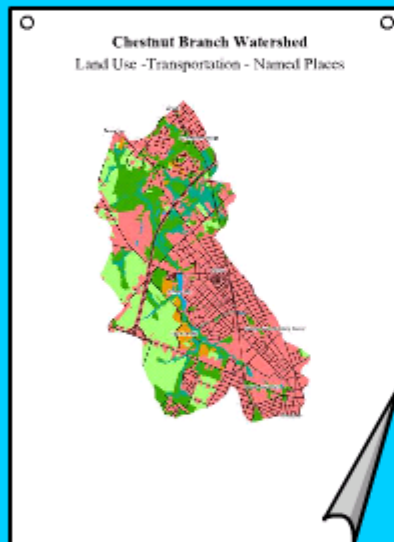


Multimedia GIS



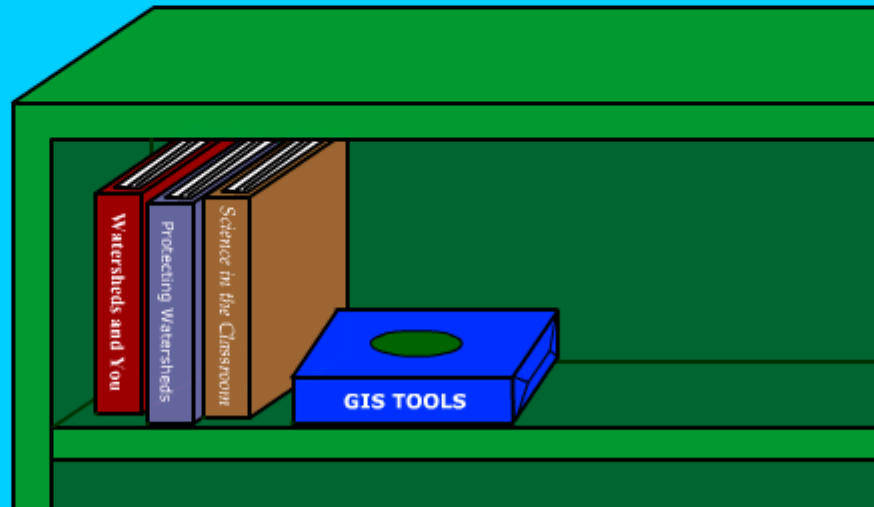
- ◆ Targeted focus
 - Watershed-specific
 - All available environmental data in one place
- ◆ CD-ROM based
 - Stand-alone browser, GIS viewer, PDF maps
 - Good when Internet access a problem
- ◆ Web based
 - Online repository
 - Ability to upload / view new monitoring data

Chestnut Branch Watershed CD-Rom



- What is a Watershed?
- Protect your watershed
- Educational Projects
- Install GIS Viewer
- View GIS Data ●

Rowan University



<http://users.rowan.edu/~reis0176/cd/index.html>

Inset Map

New Data Frame 2

Layers

- ☒ New Group Layer
 - ☒ Major Roads
 - ☒ Railroads
 - ☒ gis_clip
 - ☒ chestnut_boundar
 - ☒ Watershed Bo
 - ☒ Schools
 - ☒ Named Places
- ☐ Public Community Wat
- ☐ OWNER
- ☒ Glassboro Water C
- ☒ Mantua Twp MUA
- ☒ Pitman Water Dep
- ☐ Known Contaminated
- ☐ Parcels
- ☐ Forests
- ☐ Wetlands
- ☐ Surface Water
- ☐ 1995 Urban Lands
- ☐ 1995 Land Use
- ☐ TYPE95
- ☐ AGRICULTURE
- ☐ BARREN LAND
- ☐ FOREST
- ☐ URBAN

Display Source

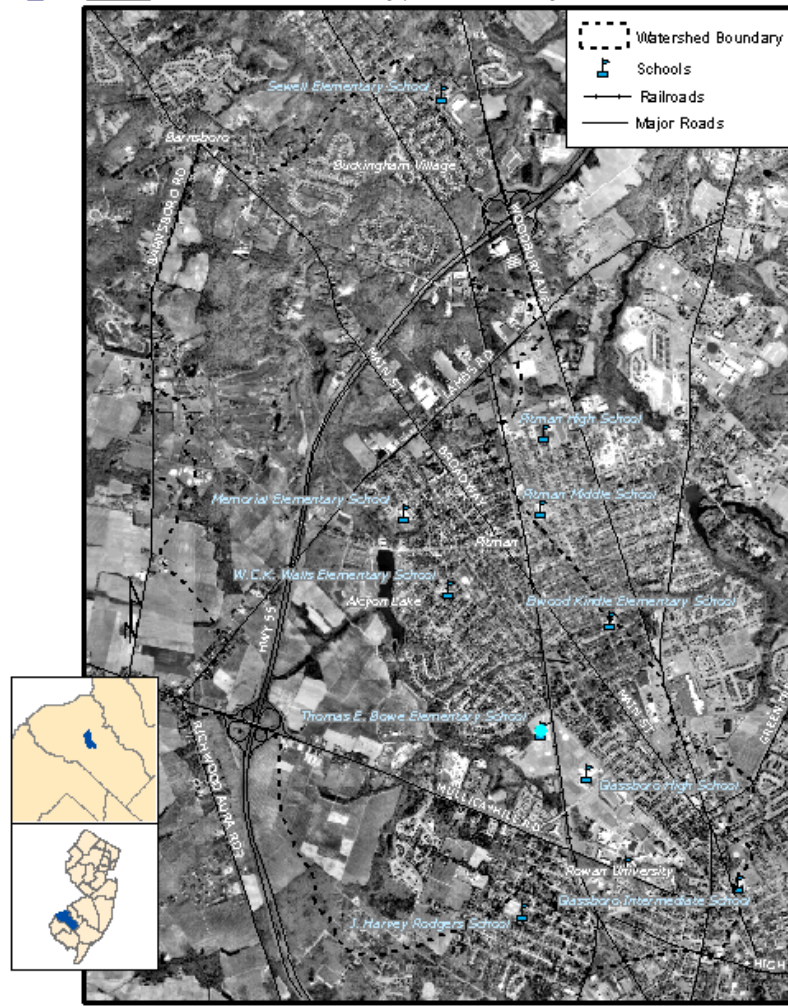
Drawing



Chestnut Branch Watershed

Gloucester County, New Jersey

Schools



Benefits to Community

- ◆ Worthwhile applied research
- ◆ Solving present needs
- ◆ Planning for the future
- ◆ Strengthens “Town and Gown” relations

Benefits to Students

- ◆ Experience on “real world” projects
- ◆ Non-traditional learning environment
 - Project-based, not lectures!
 - Increased understanding of hydrologic processes
- ◆ Enhanced career “marketability”



Case Studies:

◆ Dr. DeMond Miller

- Communicating Environmental Information to Diverse Communities

◆ Jennifer Misner

- Watershed Assessment Using GIS

◆ Dr. Jess Everett

- Lake Sediment Mapping
- Web-based data management

Questions?



November 7-8, 2003

NJ Volunteer Monitoring Summit